Space Weather Forecast

Issued on Tuesday, 11 July 2023 at 01:19 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: G1/Minor Storm likely, chance of G2/Moderate Storm on 13 July with CME arrival. Chance of R1/R2 Radio Blackouts throughout.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity has been Moderate, with two Moderate-class flares peaking at 10/0355 UTC and 10/2217 UTC, from the complex of sunspot regions in the southwest. There are currently eleven active regions on the visible disc. A region in the northwest is the most magnetically complex region. The largest region is in the southeast, as a large unipolar spot. There are three regions all close together in the southwest, with some magnetic interaction between these regions, probably increasing instability. A region near north centre disc continues to evolve, but doesn't have any obvious significant complexity at the moment. Most of the remaining regions appear to be small and simple at present.
A partial halo Coronal Mass Ejection (CME) associated with the earlier Moderate-class flare was seen travelling towards the southwest in coronagraph imagery and an Earth directed component is considered probable as detailed below.

Solar Wind / Geomagnetic Activity: The solar wind was at slow levels throughout and varied between 330-370 km/s. Total magnetic field strength has been weak throughout, whilst the north-south component also varied weakly. Geomagnetic activity has been at Quiet levels throughout (Kp 0-2).

Energetic Particles / Solar Radiation: No solar radiation storms were observed, although levels of energetic particles were raised slightly above the normal background level as a result of the moderate class flare.

Four-Day Space Weather Forecast Summary

Solar Activity: Low to Moderate solar activity is most likely through the period, with a slight chance of an isolated Strong flare.

Solar Wind / Geomagnetic Activity: A partial halo CME associated with the Moderate-class flare at 10/0355 UTC was seen travelling towards the southwest in coronagraph imagery. An Earth directed shock component is considered probable. At this stage, an arrival time of around 13/0600 UTC is most likely, but confidence is rather low. The solar wind is currently at slow levels and is likely to remain that way until the CME arrival. As the CME effects continue, a coronal hole fast wind is likely to arrive during Day 3 (13 July). The combination of CME effects and fast wind could lead to increased geomagnetic impacts.
Geomagnetic activity is forecast to be Quiet at first, becoming Active to Minor Storm with a chance of Moderate Storm intervals due to CME and fast wind effects on Day 3 (13 July), then probably returning to Unsettled by Day 4 (14 July).

Energetic Particles / Solar Radiation: Solar radiation has a slight chance of reaching the

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S1/Minor Storm threshold through the period, should a larger flare occur.

Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	1	1	30	20
Strong	G3	No	1	1	5	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	No	50	50	50	40
Very Active	R3 to R5 X	No	5	5	5	1

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	10	10	10	10
Very Active	≥ S3 *	No	1	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

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